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RESEARCH PROVES VALUE OF DDT
IN CONTROL OF STORED GRAIN INSECTS

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Recent research by entomologists of the U. S. Department of Agriculture shows that DDT - the versatile insecticide developed in World War II to protect our troops against insect-borne diseases - is useful for killing stored-grain insects that hide in the woodwork of bins and other storage places. DDT residues from a spray applied to the woodwork will kill these insects even if they do not come out until long after the application is made. This residual action makes the use of DDT sprays in empty bins an effective supplement to sanitation and fumigation, now standard procedure for combatting the myriad worms, beetles, and moths that infest stored grain. It is estimated that each year in the United States these pests destroy 300,000,000 bushels of grain, worth well over \$600,000,000 at today's prices. Clean-up of the empty grain bins, in preparation for the new harvest, and fumigation of grain after it has been put in them cannot be depended on to kill all insect life present in the bins, the entomologists say. Some of the most costly pests, including the cadelle, the yellow mealworm, and grain beetles and weevils, hide in cracks and holes that the cadelle gnaws in the woodwork where the vapor of the fumigant may not become strong enough to kill them. When they crawl out from their burrows onto a surface previously sprayed with DDT, however, they succumb to the insecticidal residue.

Entomologists at the Manhattan and Hutchison, Kansas, stations of the Bureau of Entomology and Plant Quarantine are continuing their research, which revealed the effectiveness of DDT against stored-grain insects. They are testing new chemical compounds, including chlordane, chlorinated camphene, gamma benzene hexachloride and parathion to find the answers to such questions as: How toxic is the compound in various strengths and combinations with different diluents and carriers? How fast does it act? How long do its deposits retain their toxicity to insects? So far DDT best meets the tests necessary before the Department will recommend a new insecticide for general use as a residual spray against stored grain insects.

Tests at the Manhattan laboratory have shown that, in general, xylol-water emulsions of DDT are more efficient and act faster than water dispersions and carbon tetrachloride or acetone-kerosene solutions. They have shown too that the residual effect of the treatment varies with the surface to which it is applied. Cement surfaces remain toxic for only a very short time. Wood surfaces remain "toxic longer when unpainted than when painted."

The entomologists are studying also the effectiveness of various inert dusts applied to the top layers of grain in farm bins to control stored grain insect pests. They find that certain of these dusts - including silica gel - protect stored grain from insect attack when its moisture content is not more than 12 percent. Further work, they say, is necessary before any of these dusts can be accepted as safe and efficient for use on stored grain.

The accompanying pictures show some of the steps in the research, which is being continued, to develop better measures for the protection of cereal foods and feeds against insect damage.

(OVER)

Picture Story No. 52 - Stored Grain Insect Pest Control

(EDITORS AND WRITERS: You may obtain 8x10 glossy prints of any of the pictures here shown free on request to Press Service, Office of Information, U. S. Department of Agriculture, Washington 25, D.C.)

In testing new preparations for the control of stored grain insect pests, Department entomologists used as their laboratory guinea pig the confused flour beetle, one of the most numerous of insects attacking stored cereal products and one of the most resistant to insecticides. These beetles also are unable to crawl up the sides of glass vials and plastic rings used to confine them on experimentally treated surfaces.

(1) Technician J. K. Quinlan sprays glass plates, in triplicate, with an experimental insecticide. As soon as the deposit is dry he will put 10 beetles on each plate, with a glass vial over them, and set them aside.

(2) At the end of the exposure period, which varies from 1/2 to 24 hours, he removes the beetles from the treated plates and places them in clean glass vials containing fresh flour. Then he makes a mortality count on each lot. These counts go into the record.

Preparations that control stored-grain insect pests in laboratory tests are tried out on a larger scale under farm conditions.

(3) Entomologist G. D. White sprays a new preparation over the walls of a clean farm bin that later will be filled with grain.

(4) Entomologist White treats the surface of grain in a farm bin with a new inert dust.

(5) Later he takes a sample of stored grain the surface of which was treated with an inert dust. He would use the same technic in obtaining samples from a bin that had been sprayed with DDT before being filled with grain. He plunges a "trier" down through the grain

(6) Thus obtaining a composite sample from different depths

(7) He runs the composite sample into a pan with a wire-mesh bottom

(8) And shakes out the insects present in the sample, recording the number of insects, dead or alive, as well as any evidence of insect damage.

(9) Laboratory examination of samples submitted for the purpose reveals the protection against insect attack afforded by various treatments of bins and grain. Entomologist H. H. Walkden uses a special apparatus to count the kernels from a one-ounce sample of grain that show a break in the bran due to insect feeding.

